

RELEASE HEIGHT ADJUSTMENT OF STRESSY METAL DEVICES BY  
ANNEALING BEFORE AND AFTER RELEASE

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ABSTRACT

Spring structures are subjected to pre-release and post-release annealing to tune their tip height to match a specified target. Post-release annealing increases tip height, and pre-release annealing decreases tip height. The amount of tuning is related to the annealing temperature and/or time. Annealing schedules are determined for a pre-fabricated cache of unreleased spring structures such that finished spring structures having a variety of target heights can be economically produced by releasing/annealing the cache according to associated annealing schedules. Selective annealing is performed using lasers and heat absorbing/reflecting materials. Localized annealing is used to generate various spring structure shapes. Both stress-engineered and strain-engineered spring structures are tuned by annealing.